Section: General Medicine

Original Research Article

EVALUATION OF PREVALENCE AND RISK FACTORS PROFILE OF RESISTANT HYPERTENSION AMONG HYPERTENSIVE PATIENTS AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Backgrounds: Resistant hypertension occurs when blood pressure remains uncontrolled despite treatment with three or more antihypertensive medications. This condition indicates a more severe disease state and significantly increases the risk of cardiovascular events, with patients facing over four times the risk of those who achieve target blood pressure levels. Hence; the present study was conducted to evaluate prevalence and risk factors profile of resistant hypertension among hypertensive patients at a tertiary care hospital. **Materials & Methods:** The study collected comprehensive data on patients with resistant hypertension, including demographics, lifestyle factors, treatment history, and family background. Medical history, such as diabetes, heart disease, and kidney disease, was verified through prior records. Blood pressure was measured using standardized methods, including assessment for orthostatic hypotension. Adherence to medication was evaluated using the Morisky Green Levine scale, with scores indicating adherence or non-adherence. Controlled resistant hypertension was defined as blood pressure <130/80 mmHg on multiple antihypertensive medications, including a diuretic. Data was recorded and analyzed using Microsoft Excel and SPSS software. **Results:** A total of 200 subjects were screened in the present study. Among them, resistant hypertension was seen in 35 subjects. Hence; overall prevalence of resistant hypertension was 17.5 percent. The mean age of patients with and without resistant hypertension was 48.1 years and 46.9 years respectively. The mean duration of hypertension among patients with and without resistant hypertension was 9.5 years and 5.9 years respectively. The mean duration of hypertension, disordered sleep, obesity and diabetes were found to be significant risk factors for resistant hypertension. **Conclusion:** Controlling resistant hypertension is a significant challenge, despite the existence of management guidelines. A major obstacle is the limited understanding of its underlying mechanisms and risk factors.

INTRODUCTION

Resistant hypertension is characterized by an inadequate response to treatment with three or more antihypertensive agents, indicating a more advanced stage of the condition, which is associated with a risk of cardiovascular events that is more than four times greater than that of patients who successfully meet blood pressure targets. The Joint National Committee defines resistant hypertension as the inability to achieve target blood pressure despite the administration of a full-dose regimen of three appropriate medications, including diuretics. Similarly, the European Society of Hypertension describes it as hypertension that remains unmanageable through lifestyle modifications and requires at least three medications, including a diuretic, to reach the desired blood pressure levels. These definitions are valid and should be adjusted according to the urgency of treatment, which is influenced by the current severity of hypertension, with more severe stages necessitating a more immediate intervention.[1- 3]

To accurately diagnose resistant hypertension, it is essential to rule out non-adherence to antihypertensive medications and the white coat effect, which is characterized by elevated blood pressure readings in clinical settings that normalize outside of such environments. This condition represents a high-risk phenotype associated with elevated all-cause mortality and adverse cardiovascular disease outcomes.[4] Adopting healthy lifestyle practices has been shown to mitigate cardiovascular risk in individuals suffering from

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resistant hypertension. Furthermore, aldosterone excess is frequently observed in these patients, and the incorporation of spironolactone or amiloride into a standard regimen of three antihypertensive medications has proven effective in achieving target blood pressure levels for the majority of affected individuals. Refractory hypertension is identified as uncontrolled blood pressure despite the administration of five or more antihypertensive agents from various classes, including a long-acting thiazide-like diuretic and a mineralocorticoid receptor antagonist, at maximum or optimally tolerated dosages. The primary mechanism contributing to resistant hypertension is fluid retention, predominantly driven by aldosterone excess, whereas individuals with refractory hypertension often display heightened sympathetic nervous system activity.[5- 7] Hence; the present study was conducted to evaluate prevalence and risk factors profile of resistant hypertension among hypertensive patients at a tertiary care hospital.

MATERIALS AND METHODS

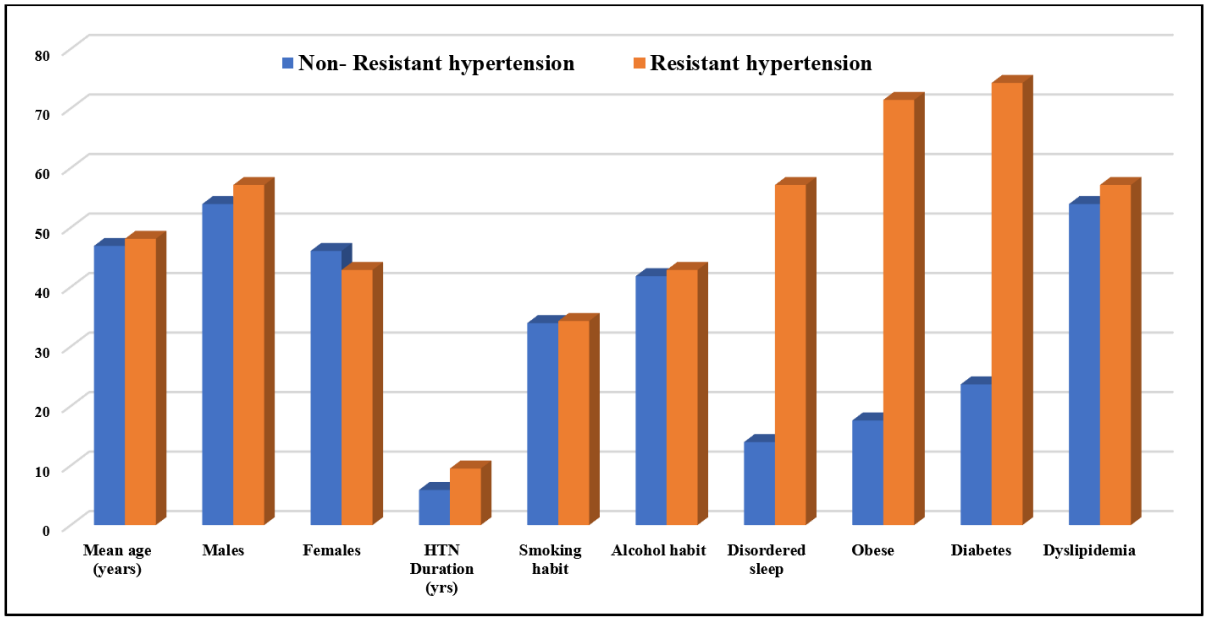
Comprehensive demographic information, including age, gender, and occupation, along with lifestyle factors, treatment history, family background regarding hypertension, and indicators of secondary hypertension, were documented using a structured proforma. The existence of diabetes mellitus, ischemic heart disease (IHD), chronic kidney disease, dyslipidemia, and thyroid disorders were verified through the patients' prior medical records. Standardized precautions were implemented during blood pressure measurements, which were taken using a mercury sphygmomanometer on both arms while the patient was in a standing position to assess for orthostatic hypotension. Blood pressure was re-evaluated after a few minutes in the arm that exhibited the higher reading, with the second measurement being recorded as the patient's actual blood pressure. Adherence to antihypertensive therapy was evaluated utilizing the Morisky Green Levine adherence scale, where a score of ≥3 out of 4 indicated non-adherence. Controlled resistant hypertension was characterized as having a blood pressure reading of less than 130/80 mmHg while on more than three antihypertensive medications at maximal or maximally tolerated doses, including a diuretic. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. Chi-square test was used for evaluation of the level of significance.

RESULTS

A total of 200 subjects were screened in the present study. Among them, resistant hypertension was seen in 35 subjects. Hence; overall prevalence of resistant hypertension was 17.5 percent. The mean age of patients with and without resistant hypertension was 48.1 years and 46.9 years respectively. The mean duration of hypertension among patients with and without resistant hypertension was 9.5 years and 5.9 years respectively. The mean duration of hypertension, disordered sleep, obesity and diabetes were found to be significant risk factors for resistant hypertension.

Table 1: Prevalence of Resistant hypertension.

Variable	Number	Percentage
Controlled hypertension	165	82.5
Resistant hypertension	35	17.5
Total	200	100



Graph 1: Risk factors

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Table 2: Risk factors of resistant hypertension.

Variable	Non- Resistant hypertension	Resistant hypertension	p-value
Mean age (years)	46.9	48.1	0.81
Males	53.94	57.14	0.46
Females	46.06	42.86	
Mean duration of hypertension (years)	5.9	9.5	0.00*
Smoking habit	33.94	34.29	0.64
Alcohol consumption habit	41.82	42.86	0.76
Disordered sleep	13.94	57.14	0.00*
Obese	17.58	71.43	0.00*
Diabetes	23.64	74.29	0.00*
Dyslipidaemia	53.94	57.14	0.63

DISCUSSION

Uncontrolled hypertension represents a significant cardiovascular risk factor globally, contributing to an increased likelihood of stroke, myocardial infarction, heart failure, and renal failure. A recent statement from the American Heart Association (AHA) has classified resistant hypertension as blood pressure that remains above the target level despite the simultaneous administration of three different classes of antihypertensive medications, ideally including a diuretic, with all medications prescribed at optimal dosages. Despite acknowledging that these patients represent a higher risk group, the literature has inadequately characterized individuals with resistant hypertension. Estimates of prevalence indicate that between 3% and 30% of hypertensive patients require three or more medications to achieve adequate blood pressure control. However, the incidence of resistant hypertension remains poorly defined and has been identified as a priority area by the AHA. A deeper understanding of the incidence and outcomes related to resistant hypertension is crucial for enhancing the management of these patients.[7-10] Hence; the present study was conducted to evaluate prevalence and risk factors profile of resistant hypertension among hypertensive patients at a tertiary care hospital.

A total of 200 subjects were screened in the present study. Among them, resistant hypertension was seen in 35 subjects. Hence; overall prevalence of resistant hypertension was 17.5 percent. The mean age of patients with and without resistant hypertension was 48.1 years and 46.9 years respectively. The mean duration of hypertension among patients with and without resistant hypertension was 9.5 years and 5.9 years respectively. The mean duration of hypertension, disordered sleep, obesity and diabetes were found to be significant risk factors for resistant hypertension. Mahapatra R assessed the prevalence and factors associated with RH. A total of 275 patients were included. The mean age was 56years and 61% were females. The mean duration of hypertension was 7 years; 77% of patients were overweight or obese. A family history of hypertension was present in 30% and 18% had diabetes mellitus. History suggests secondary hypertension was present in 13%. BP was controlled (<130/80 mm of hg) in 145 (53%), uncontrolled in 130 (47%) and resistant hypertension was seen in 31 patients. Duration of hypertension, obesity, and elevated fasting blood sugar were significantly associated with RH. RH was found in 11% of hypertensive patients. Longer duration of hypertension, obesity, and higher fasting blood glucose were associated with RH.[11]

Kumara WA et al studied the prevalence and define deferential risk factors for 'Resistant' hypertension (RH) in a hypertensive population of South Asian origin. Mean age was 61 years and 50.2% were males. The mean of average systolic and diastolic blood pressures (BP) were 133.04 mmHg and 81.07 mmHg respectively. Uncontrolled BP was present in 41.1% (n = 114) of patients, of which RH was present in 19.1% (n = 53). Uncontrolled BP were due to 'therapeutic inertia' in 27.8% of the study population. Those with diabetes mellitus, obesity and those who were older than 55 years were significantly higher in the RHT group than in the non-RH group. In the binary logistic regression analysis older age, longer duration of hypertension, presence of diabetes mellitus and being obese were significantly associated with RH.[12] Naseem R et al evaluated the prevalence and determinants of resistant hypertension in an Asian cohort of hypertensive patients. A total of 515 patients were included in the study. Overall, 12% of the total patients (n=62) were resistant hypertensives and 25% (n=129) had pseudo-resistant hypertension. Resistant patients were more often females, older and had a higher body mass index. Use of painkillers and noncompliance to dietary recommendations were found to be significant determinants of resistant hypertension. Prevalence of comorbid conditions, including diabetes, hyperlipidemia, and chronic kidney disease, was not significantly higher in patients with resistant hypertension.[13]

CONCLUSION

Controlling resistant hypertension is a significant challenge, despite the existence of management guidelines. A major obstacle is the limited understanding of its underlying mechanisms and risk factors. Additionally, patient-related factors, such as non-adherence to treatment and lack of knowledge, can hinder effective management. Healthcare system limitations, including resource constraints and poor appointment tracking, also play a role. Overall, managing resistant hypertension is complex and often requires costly testing to identify underlying

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causes, making it difficult to achieve recommended blood pressure levels.

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